DOCUMENT RESUME

ED 067 245 SE 014 503

| | |
|---|---|
| TITLE | Environment, Teacher Manual, Primary, Idea 2, Air. |
| INSTITUTION | Environmental Education Project, Grafton, Ill. |
| SPONS AGENCY | Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C. |
| PUB DATE | [72] |
| NOTE | 58p. |
| EDRS PRICE | MF-$0.65 HC-$3.29 |
| DESCRIPTORS | *Air Pollution Control; *Environmental Education; Instructional Materials; Learning Activities; Natural Resources; *Primary Grades; *Teaching Guides; Units of Study (Subject Fields) |
| IDENTIFIERS | Elementary Secondary Education Act Title III; ESEA Title III |

ABSTRACT

The Environmental Education Project Center has developed these guidelines for teaching a unit in environmental studies. It is their intention that the teacher and student cooperatively plan the approach and content to be used during the course of study. In this unit about air, teacher resource information and student material are combined to form a teacher's manual for use in the primary grade levels. Project objectives and behavioral objectives introduce the unit followed by ideas, actions, and/or activities to develop awareness of air qualities and pollution effects. Major topics of discussion range from identifying sources and symptoms of air pollution to testing air quality and developing constructive action to combat pollution. Field trips emphasizing concepts previously learned are suggested and additional sources of information and materials for both students and teachers are listed. This work was prepared under an ESEA Title III contract for the project "Operation Survival Through Environmental Education." (BL)

ED 067245

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

# E N V I R O N M E N T

PRIMARY
Idea 2
Air

# T E A C H E R  M A N U A L

Title III
ESEA

"Operation Survival Through
Environmental Education"

Environmental Education Project

Box 122

Grafton, Illinois 62037
Phone: 618-786-3313

# ENVIRONMENTAL IDEAS

# FOR THE STUDENT

---

## -Air-

Contents

Introduction

Action 1 Who Needs Air?

Action 2 How Much Air Is There?

Action 3 What Is Clean Air?

Action 4 How Does Air Get Polluted?

Action 5 What Can I Do?

Action 6 Let's Go on a Field Trip

A. Concepts Are Important
B. Where Are The Sites?
C. Let's Experiment

Action 7 Use Resources to Reach Greater Heights

A. Resources Made Easy
B. Multiple Student Materials
C. Experts in the Air
D. "I See and I Remember..."

# I N T R O D U C T I O N

# to

# ENVIRONMENT Idea 2 Air

# PRIMARY RESOURCE UNIT

The Title III, Environmental Education Project Center is providing your class with the following materials to teach a unit on air.

Student Manuals - 1 per student
Teacher Manual - 1
Supplementary Materials (as requested by the classroom teacher)

It is the project's intention to provide guidelines for the teacher and student to cooperatively plan the approach and content to be used during the course of study. All or part of the material can be used after evaluating the needs of the students.

Behavioral objectives give definite direction for instruction and measurement of achievement. The following list of behavioral objectives are those which relate to air pollution. This list is not to meant to be all inclusive. These objectives do relate to major local air pollution problems. The teacher is urged to teach these objectives in presenting the unit.

The teacher is encouraged to expand on this list. If additional objectives are written and taught, the student pre- and post-test is to be expanded by the teacher to include these objectives.

- decrease in leaf burning
- decrease in use of trash burning barrels
- decrease in burning off areas of vegetation cover on fields
- decrease in use of pesticides in the homes, the gardens, and the fields
- decrease in the number of pounds of litter on a 50 foot section of Wood River Creek

- increase in use of litter bags in automobiles

- increase in the purchase of soft drinks in returnable containers

- increase in classroom use of films and filmstrips on environmental education

- increase in books and magazines relative to environmental problems checked out of school libraries and instructional materials centers

- increase in number of subscriptions to periodicals and other publications relative to environmental education

Students and families of students involved in the project are evaluated on the basis of the above stated objectives. Any different approach that you and/or your students might conceive that will further develop these objectives will be most welcome at the Project Center.

A concept-activity file is constantly being formulated at the Project Center to supplement the resource unit. Additional activities should be evaluated and used to increase motivation and interest depending on the students' background.

The concepts as stated in the original proposal are further stated in the field trip section. These concepts are primarily concerned with the air unit. Additional concepts should be developed to meet the needs of the individual teacher and students at the appropriate grade level.

Behavioral objectives are necessary to devise a method of evaluation and proper instruction. The following behavioral objectives are listed as a basis to follow in the teaching of the air unit. Additional objectives should be devised by the teacher as they apply to the individual needs of the students.

1. Students will identify organisms needing air to live.

2. Students will identify sources of air pollution.

3. Students will test for air pollution using various devices.

4. Students will identify effects of air pollution.

A pre-test and a post-test must be given to each student. Included in the teacher's packet of supplementary materials is the student test to be duplicated and distributed to each student. The teacher's answer sheet is included in this guide. After completion of the pre- and post-test, please grade and provide the Project

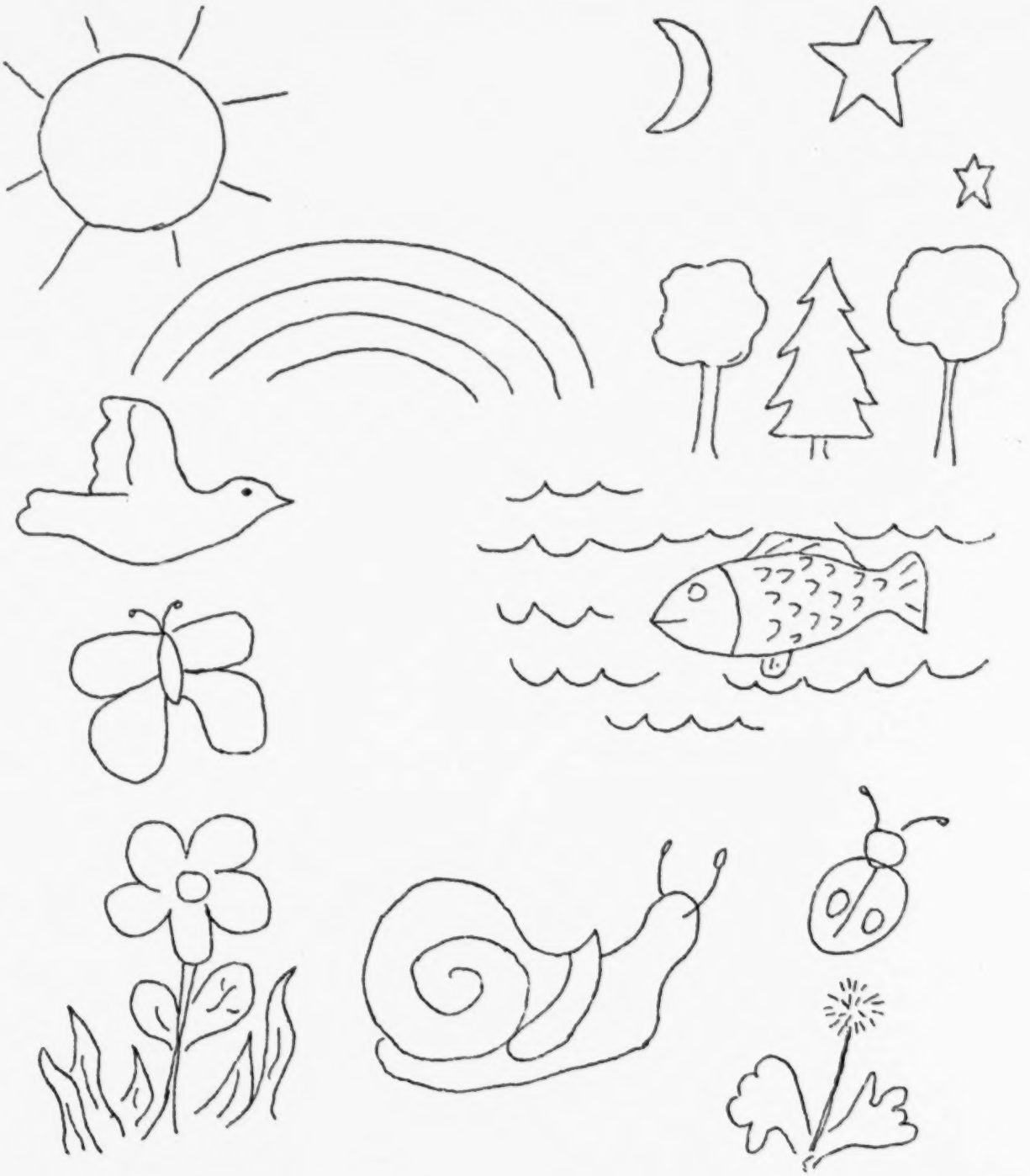
Center with the test results. We would prefer the percentage gain or loss for the entire class. Provide this necessary information by completing the teacher evaluation form.

The teacher's manual includes the actual student guide plus guidelines for the teacher to use while instructing students. Actions 6 and 7 are for your use in conducting field trips and determining what resources you want to use.

Not included in the teacher's manual are the transparency masters and the charts/forms for student use. These items are included in the teacher packet of supplementary materials. This arrangement will allow you to make multiple copies to distribute to your students. You are invited to obtain a teacher packet on a loan basis from the Title III Environmental Education Center. Our telephone number is 618-786-3313.

Color the living things that need air.

Put a line under things that don't need air.



Color in smoke where it could be.
Color it black.

Put a line under things that don't smoke.

# TEACHER'S GUIDE

## PRE- and POST-TEST

Instructions: Two sheets are provided. Have the students follow the instructions. Grading the test should be qualitative rather than quantitative. For instance, assign a grade based on 0-10 as to how you think the student understood the concept involved. Grade both pre- and post-test the same. If the 0-10 basis is used, it will be easy to convert to percentages for our report.

You cannot see me,

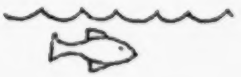
But you can feel me,

Sometimes I am in a hurry,

But sometimes I am very still.

Although most of me is above the ground, some of me is not.

Some of me is even in water!

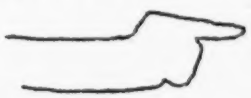


Kites need me,

Ducks must have me,

Moles and worms use me all the time,

Even <u>YOU</u> must always have me about!



What am I?

# ENVIRONMENT

## Idea 2
## Air

## Action 1

Who needs Air?

How long can you hold your breath?

Take a deep breath.

Hold it!

Time yourself with the clock.


Could you hold your breath for one minute?

Now sit quietly for three minutes.

If there were no air in the room, you would be dead in three minutes!

Just how important is air to you?

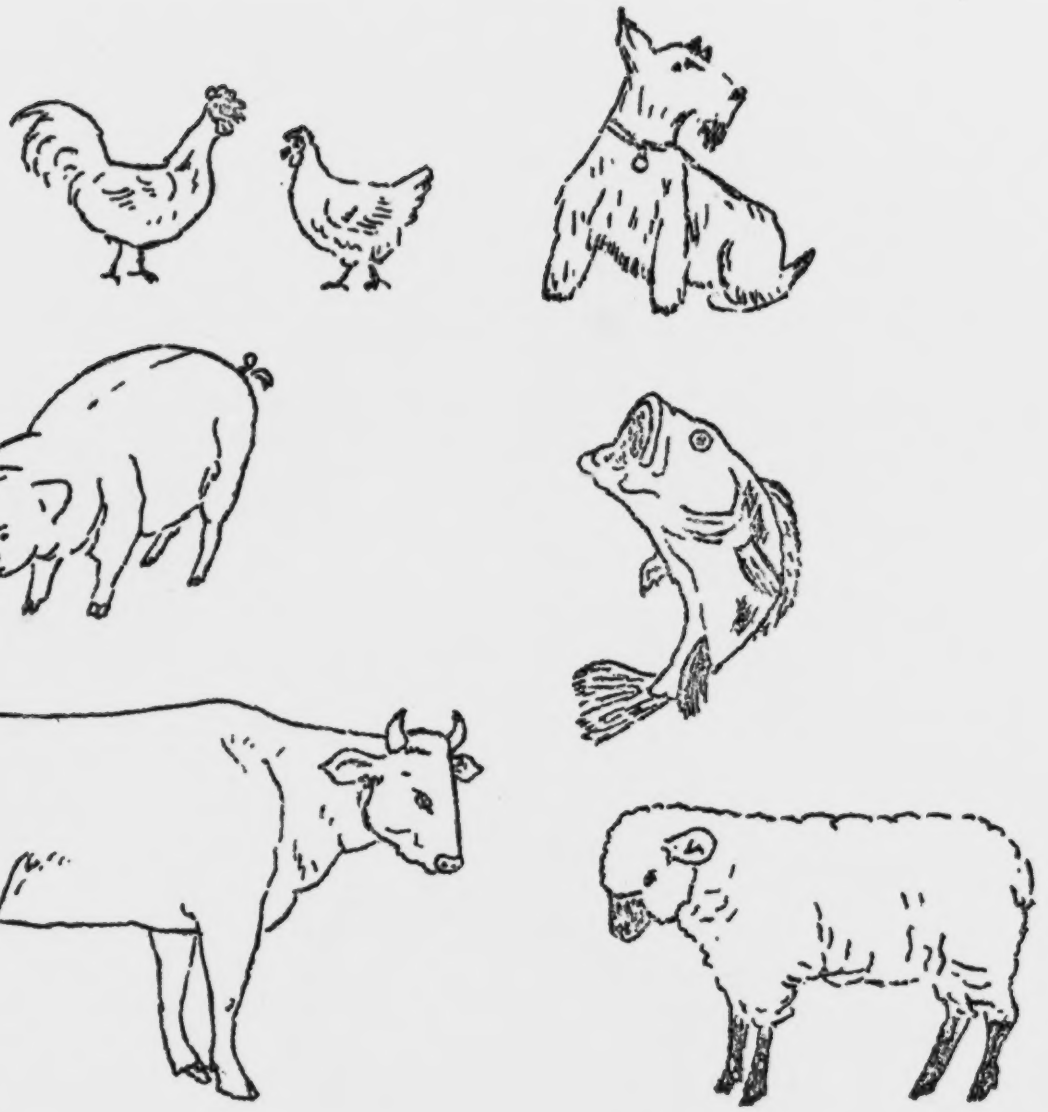
How important is air to other living things?

Think of a living thing that needs air.

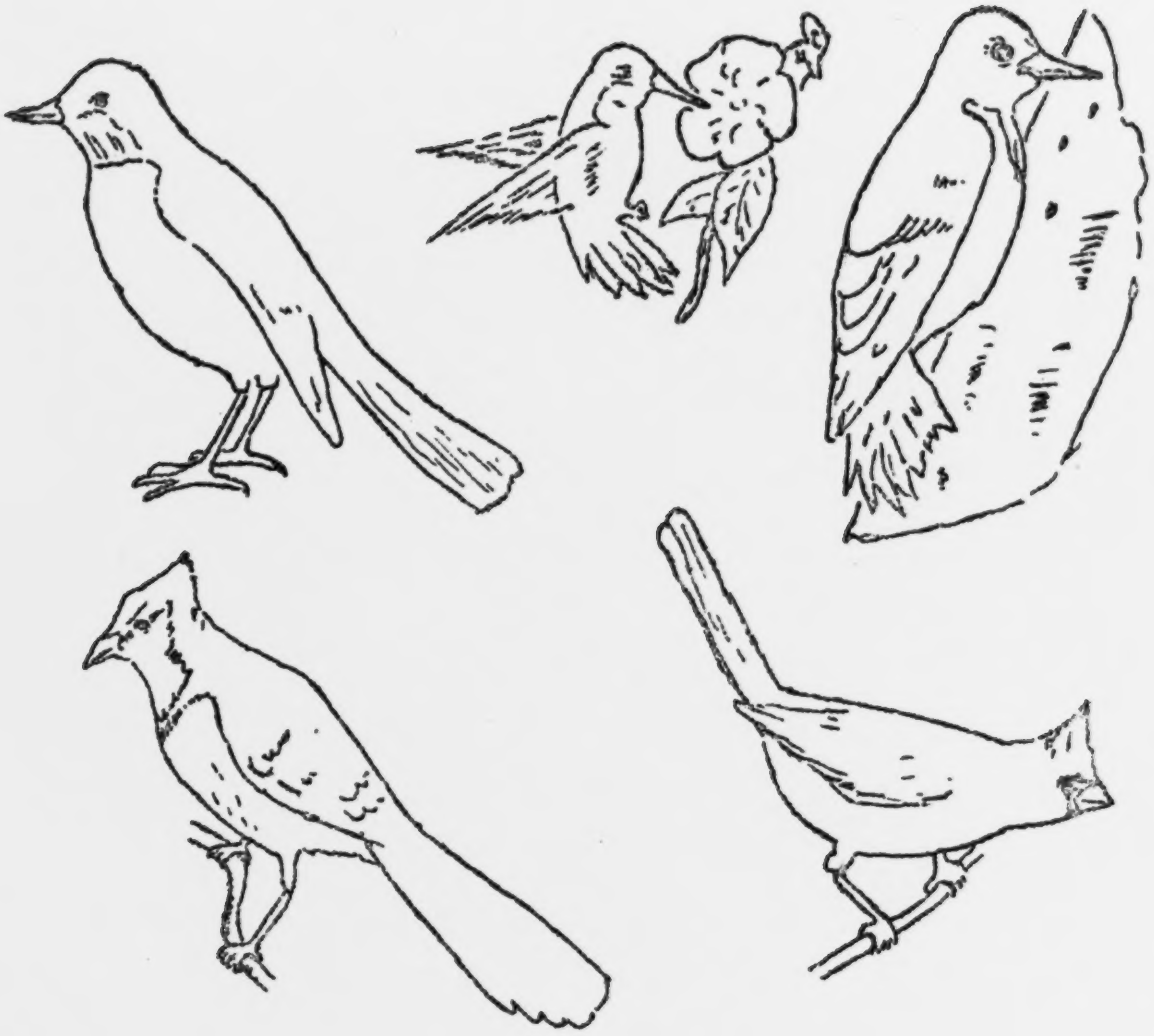
Raise your hand.

Your teacher will write the name on the board.

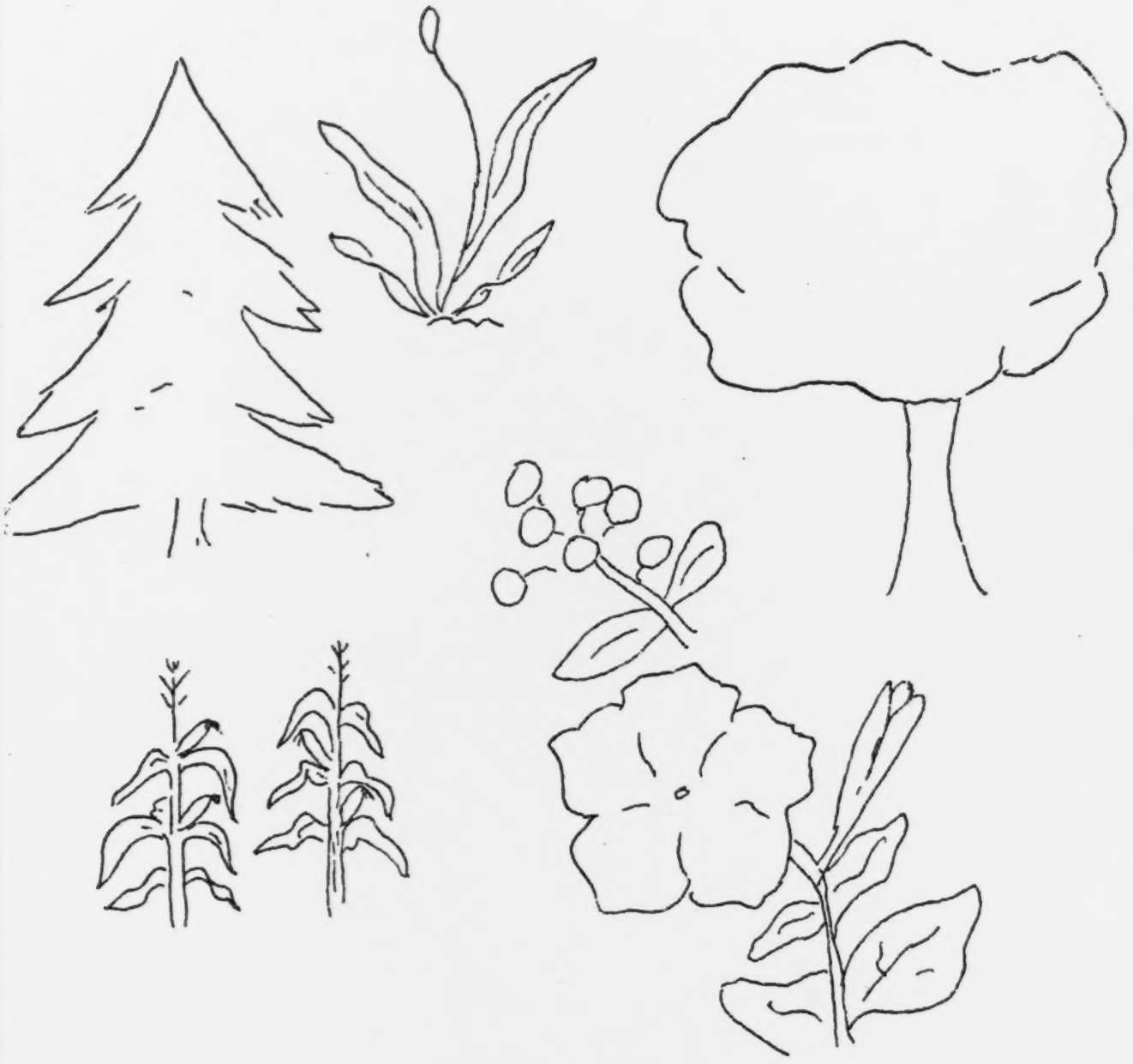
# Animals Need Air



# Birds Need Air



# Plants Need Air



# TEACHER'S GUIDE

## ACTION I

Most children should know something about air. They probably know that they can't see air, but they can feel it's movement. They may not know that air is in water and in the soil or that almost every living thing must have air.

More specifically, living things need oxygen, which makes up about 21% of the mixture of gases that we call air. Most of the rest of the mixture is nitrogen (78%) with small amounts of carbon dioxide (0.03%) used by plants in photosynthesis, and small amounts of argon and other inert gases. Air also contains varying amounts of water vapor. This may be demonstrated by sponging a wet spot on the chalkboard. As the wet spot disappears, ask the students where the water is going. (It is being absorbed into the air.)

If your group is capable of understanding the composition of air, you might try the following demonstrations to illustrate the various gases.

1. Oxygen
   a. Light a candle and place it in some type of container that will hold about an inch of water. Invert a jar or glass over the candle with the bottom in the water. The candle will burn briefly and go out. Some water will be drawn up into the glass. The candle was burning oxygen and as no other air could get into the glass, water replaced the oxygen.

   b. Put a wad of steel wool tightly in the bottom of a large test tube or baby food jar. Pour water in the jar to cover the steel wool and let set for a short while. Pour the water off and invert the jar in about an inch of water in another container. Let set for at least a day. Water will be drawn up into the jar and the steel wool will be very rusty. The oxidation of the steel is the same as something burning only slower.

2. Carbon dioxide
   Lime water can be purchased in small amounts from the drugstore. When it comes in contact with carbon dioxide, it turns a milky color. This may be demonstrated quickly by blowing through some limewater with a straw. The carbon dioxide in the breath immediately turns the lime water milky. Another sample of the lime water may be exposed to the room air for a time to show that there is carbon dioxide in the air.

3. Water vapor
   Use some container such as a glass jar or shiny tin can. Fill with cold water and ice. Soon, beads of water will begin to form on the container. It forms because the water vapor in the air surrounding the cold container becomes cold enough to condense on the outside of the container. Make sure the container is dry to begin with.

Who Needs Air?

Most of us cannot hold our breath for very long. After a short time, we have to breathe. Some swimmers and divers can hold their breath for longer than ordinary and some people have been known to hold their breath until they are unconscious, but no one can hold their breath indefinitely. We must breathe!

A man can live without food for 5 weeks.
He can live without water for 5 days.
But he can live without air for only 5 minutes!

The average person must consume, each day;

4.5 pounds of water
2.8 pounds of food
30 to 35 pounds of air.

An exercise that might be interesting here would be for the children to count the number of breaths each takes in one minute. Most will take 14 to 18 per minute.

Not only do humans need air, all living things, except for a few organisms, need air. The three pages of animals, birds, and plants are designed as coloring pages and also as discussion aids. In the animal page, the fish may come as a surprise to some. Explain that fish, too, must have air and that they "breathe" air from the water through their gills. On the bird page, lead the discussion to two reasons birds must have air; breathing and flying. Plants, also, must have air. They use oxygen just as animals do, however, they produce oxygen as a by-product of photosynthesis. They also use carbon dioxide in photosynthesis.

Children may also draw pictures of living things that need air or they may do some "research" to find pictures of living things that need air.

## ENVIRONMENT Idea 2 Air

## Action 2

### How Much Air Is There?

The air we have now is all there is.

We can't make air.

We can't get air anywhere else.

The air we breathe covers the earth like a blanket.

The blanket is thicker at the bottom than at the top.

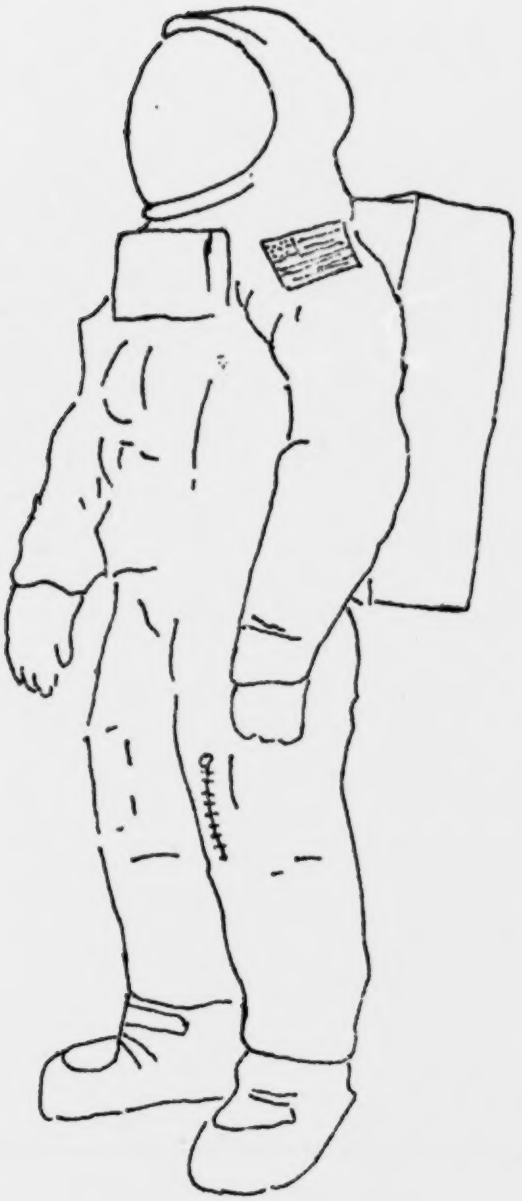
Have you ever been on top of a tall mountain?

How hard was it to breathe there?

Why does an astronaut have to wear a space suit when he leaves the earth?

# A Blanket of Air

# Astronaut's Air



# Thin Air

# TEACHER'S GUIDE

# ACTION 2

How Much Air Is There?

The earth's air, or it's atmosphere, extends several hundred miles above the surface. However, about 95% of this air is in a thin envelope called the troposphere; about 5 miles thick at the poles and 10 miles thick at the equator. (Using 8,000 miles as the diameter of the earth, the thickness of air at the equator could be represented by 4 sheets of typing paper on a 12" globe, (1 sheet typing paper$\approx$ 0.004 inches thick ). This air is constantly circulating around the globe.

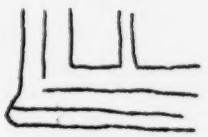
Gravity holds our air to the earth, consequently it is thickest close to the earth. An increase in altitude means less air, Perhaps some of your students have been in the mountains and have experienced the shortness of breath that comes with physical exertion at high altitudes.

Children are interested in astronauts and probably already know they took with them all of the air they breathed on their trips into space. A discussion of how they would get their air on a longer trip in space would bring out the Oxygen - Carbon Dioxide cycle between plants and animals.

# ENVIRONMENT Idea 2 Air

## Action 3

### What Is Clean Air?



Look across the room.

Can you see the air in the room?

Can you smell the air?

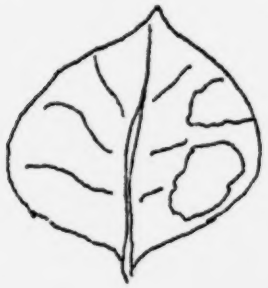
If you could see the air, or smell it, or taste it,
then something was wrong because
<u>Clean Air</u> is

Invisible!

Odorless!

Tasteless!

Some damage to plants by air pollution may look like this:



**bean leaf**

Tan to white streaks.

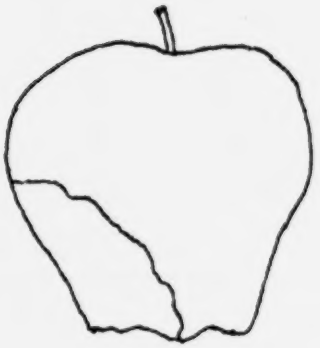
Dry, papery blotches white to straw in color.

**grass blade**

**pine needle**

Tips look as though they were burned.

Fruit may fall too soon or become soft and rotten.



**apple**

When air isn't clean, we say that it is <u>polluted</u>.

Take a walk around your school.

Look closely at some of the plants.

Have any of them been damaged by air pollution?

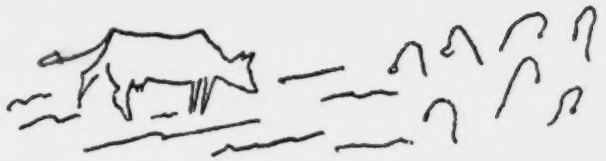
Compare with plants in a natural area. (If you can.)

Where is the pollution coming from?

Does your school use an incinerator?

Is smoke coming from the furnace?

Animals eat plants.



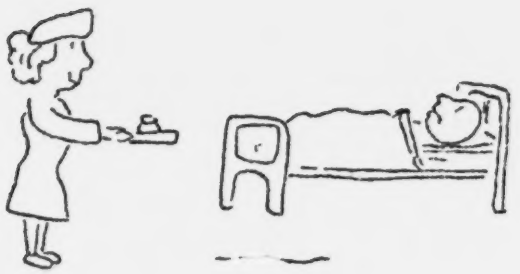
If the plants have been damaged by air pollution, the animal may get sick.

The animal may die.

Air pollution hurts people.

Children in Chicago and Los Angeles cannot play outside during bad smog days.

Many diseases are made worse by air pollution.



Polluted air can shorten your life!

Most of the diseases that air pollution has been linked with have to do with breathing.

LUNG CANCER

EMPHYSEMA

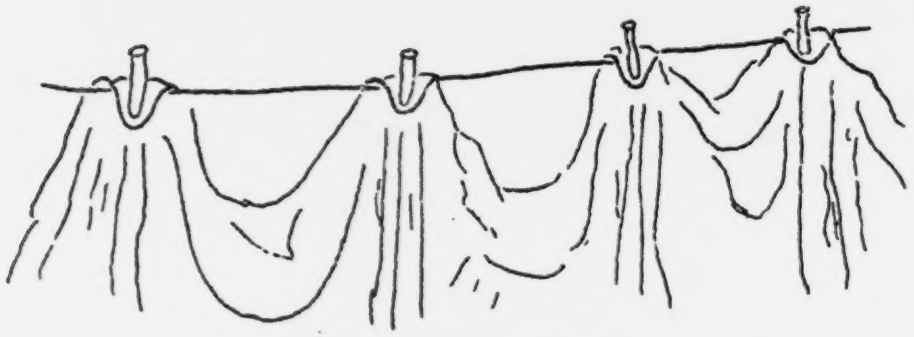
COMMON COLD

PNEUMONIA

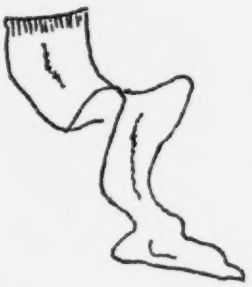
BRONCHITIS

BRONCHIAL ASTHMA

Polluted air makes clothes dirty.

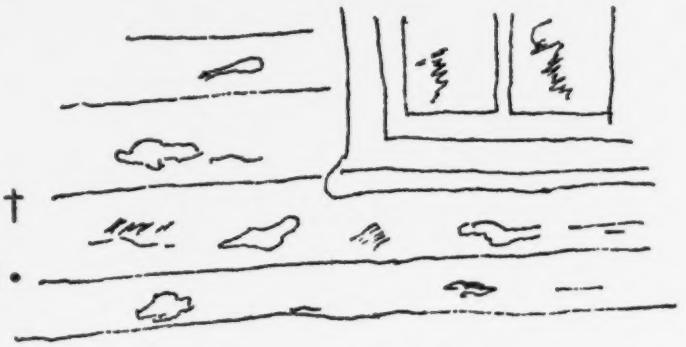


It eats holes in some clothes.

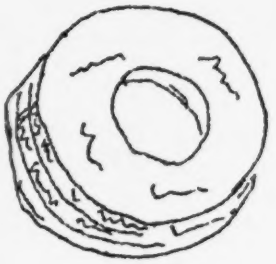


It makes houses hard to keep clean.

Windows get dirty.
Paint doesn't last long.



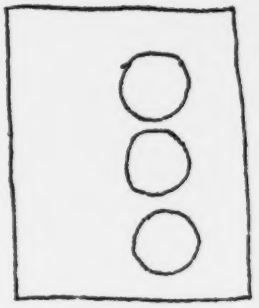
Tires and other rubber things don't last long.



# Test the Air

Get two pieces of stiff cardboard about the size of this page.

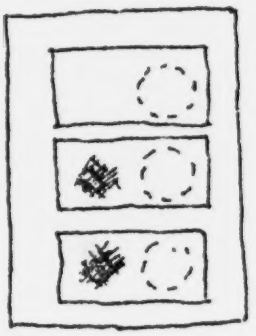
Put them together.



Cut three holes about two inches across through both sheets.

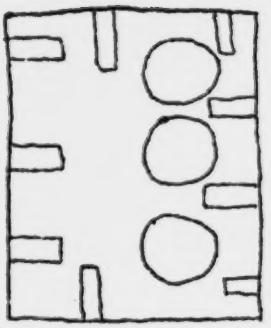
Separate the two sides.

On one side fasten strips of different material, You can use nylon, white cloth, colored cloth, rubber or whatever you want.

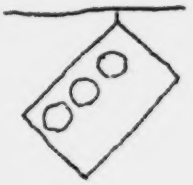


Fasten them so about half of the material covers a hole.

Replace the other side. Now you have a "sandwich" with the two pieces of cardboard as the bread and the materials inside as the filling.



Fasten the sides tightly together with tape.



Hang your sandwich outdoors for several days. (If one of the materials is colored cloth, hang in the shade so the sun doesn't bleach out the color.)

Open your "sandwich" and compare the material exposed to the air through the holes with the material that wasn't exposed.

What differences do you see?

How does air pollution affect clothing?

Why the Mask?

# TEACHER'S GUIDE

# ACTION 3

What Is Clean Air?

"Clean" air is not necessarily "pure" air. Air is considered pure when the atmosphere contains only the usual chemical components in the expected amounts. It is doubtful that there is ever any "pure" air as several natural processes put material into the air that is not considered usual. Volcanos produce vapors, dust and gases, lightning storms produce ozone, which is harmful to many things, forest fires occur naturally with resultant smoke and ashes, plants produce pollen, dust storms put tons of dirt in the air and the ocean thrusts salt particles into the atmosphere. Nature can handle these occurances, in fact, some of these particles are necessary for rain to form; but it is becoming more and more evident that nature is fighting a losing battle in combatting man's pollution.

It has been estimated that air pollution costs the United States over $12 billion a year.

Most students are aware of what pollution is. They will identify smoke, etc. in the air as "bad". Many of them, however, will have little idea as to what air pollution <u>does</u>. A walk around the school building will reveal such things as: damaged vegetation, dirty glass and peeling paint, rust and corrosion on metals, and perhaps odors and reduced sunlight. The experiment in the students' books will demonstrate damage and soiling of textiles, and the deterioration of nylon and rubber.

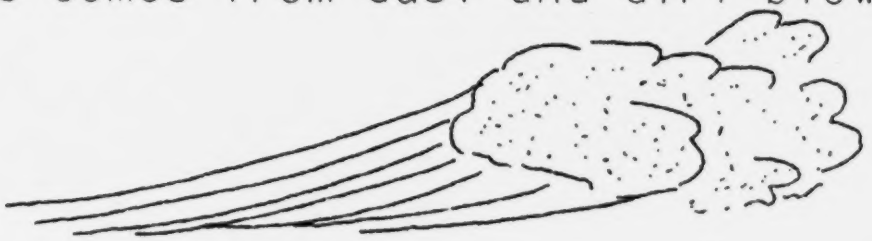
# ENVIRONMENT Idea 2 Air

## Action 4

## How Does Air Get Polluted?

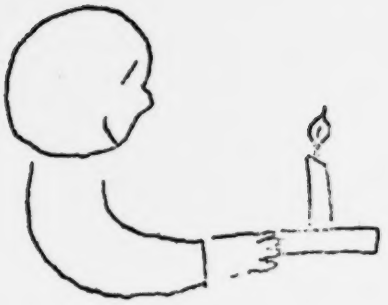
Most air pollution comes from something burning.

Some comes from dust and dirt blowing.



Some air pollution comes from odors.

Light a candle.



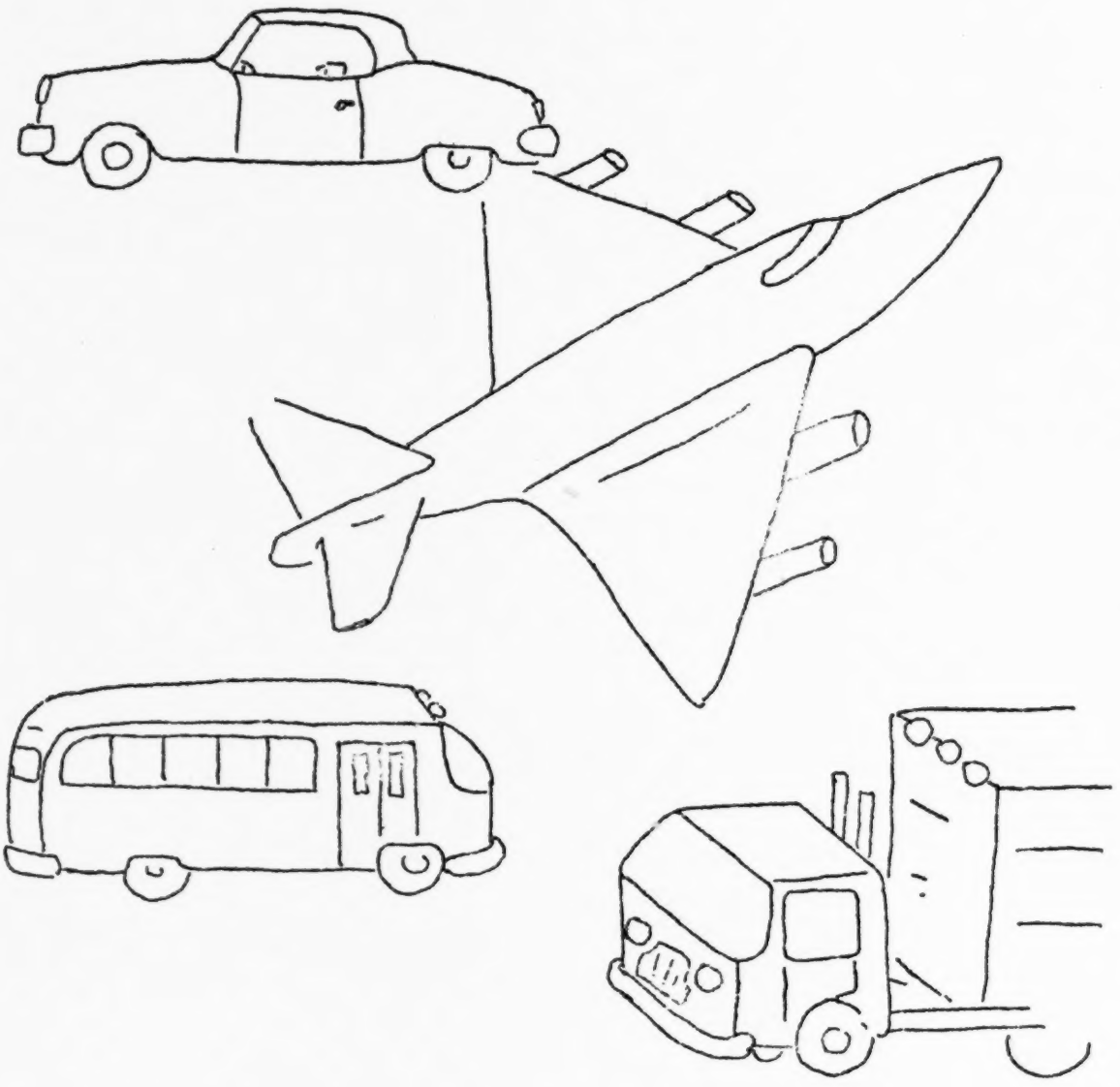
Hold a white dish
over the flame.

Look at the dish.

What do You see?

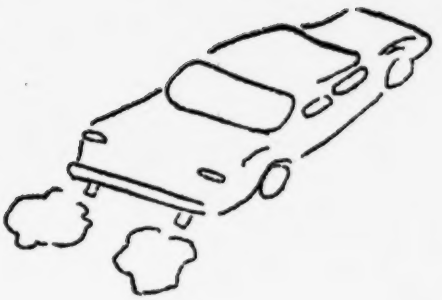
How did it get there?

Cars, Buses, Trucks and other Motor Vehicles cause a lot of air pollution.



What are they burning?

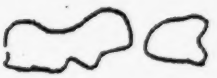
Find a safe place where you can watch a busy street corner.



Count the cars, trucks and buses that go by. Set a time to count such as 5 or 10 minutes.

Look at the exhaust of each vehicle.

What color is it?

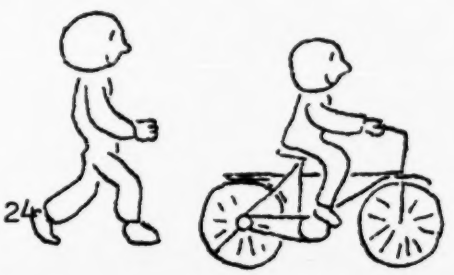


Can you see a lot of smoke?

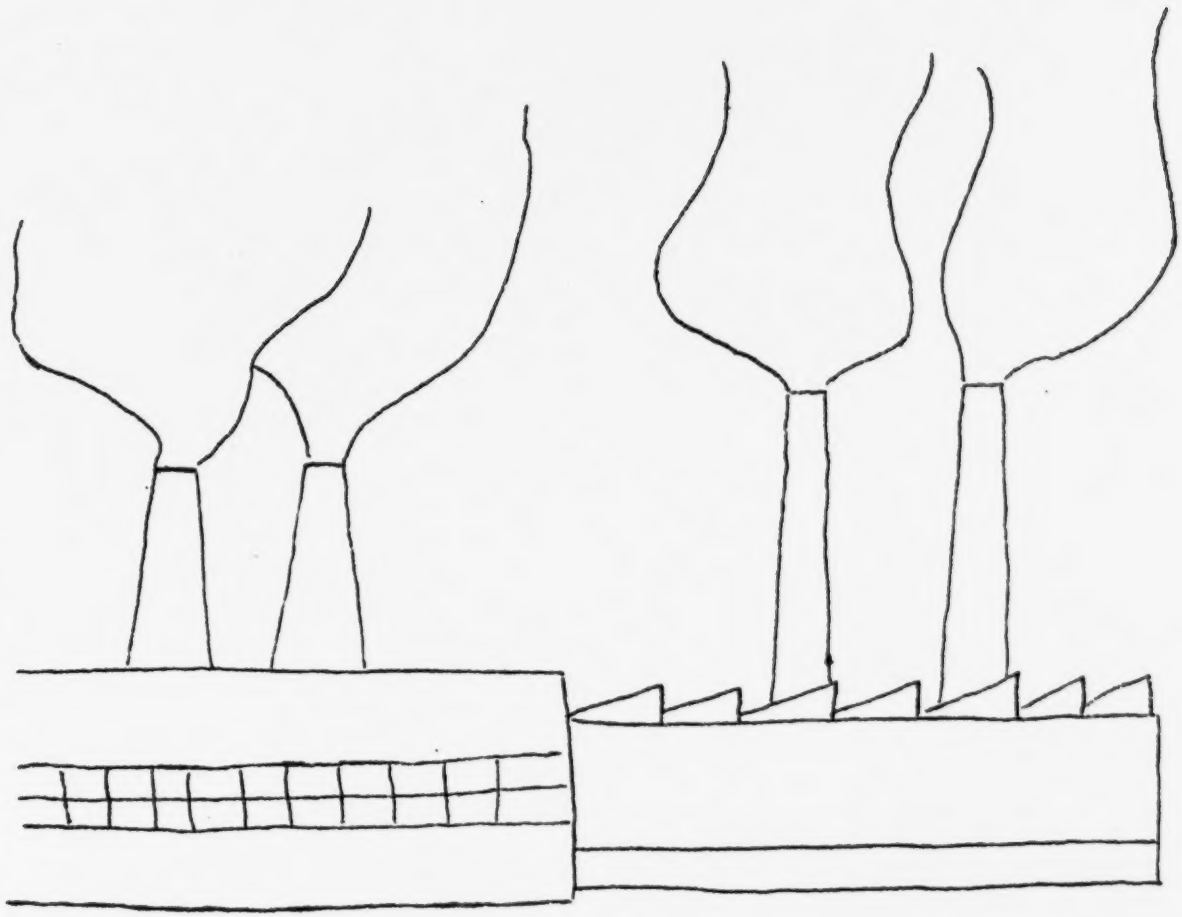
Do some cars not smoke at all?

Are they still polluting?

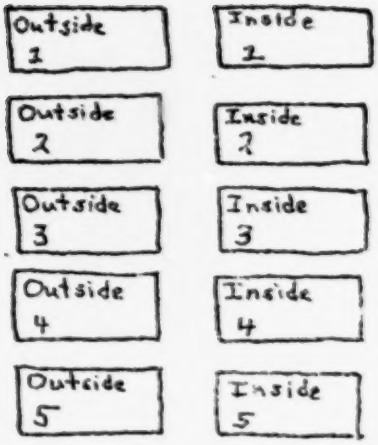
Did some people go by that were not polluting the air?



Factories and power plants add to the air pollution.



Take 10 glass microscope slides.
Label 5 of them "Outside" and number 1 to 5.
Label 5 of them "Inside" and number 1 to 5.




Smear vaseline on the slides.

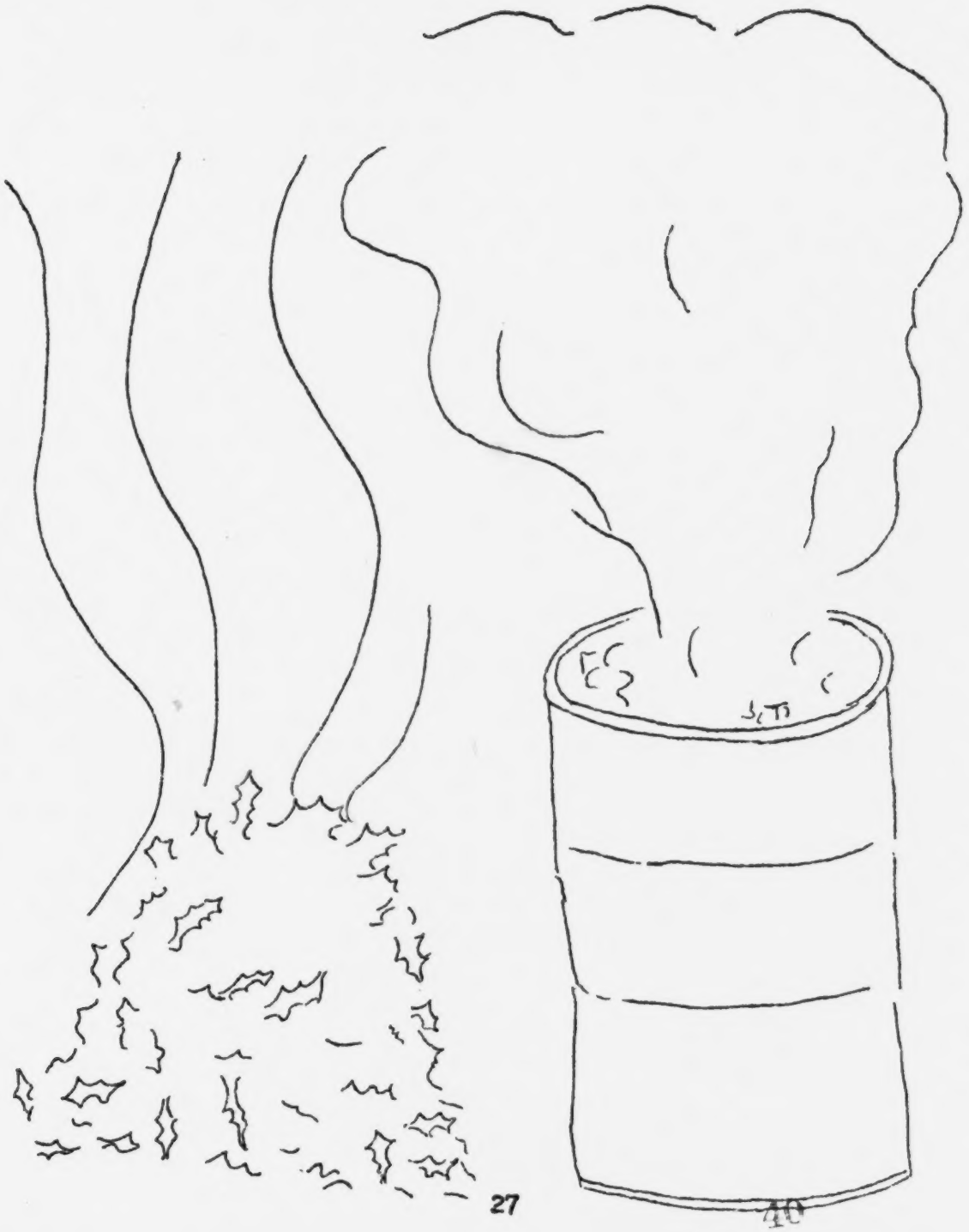
Put the "outside" slides in a protected spot outdoors. (A window ledge may work.) Put the "inside" slides inside out of the way.

The first day after placing the slides, pick up number 1, both inside and outside. The second day pick up number 2 and so on.

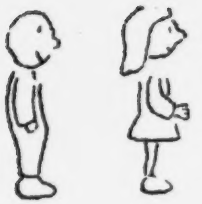
Compare the slides. (Use a microscope, microprojector, or overhead projector.)

What differences do you see?

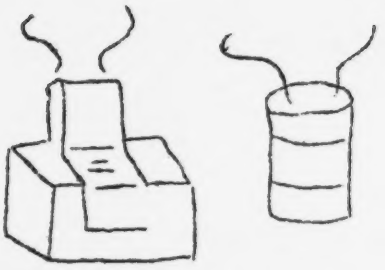
Burning trash and leaves cause air pollution.



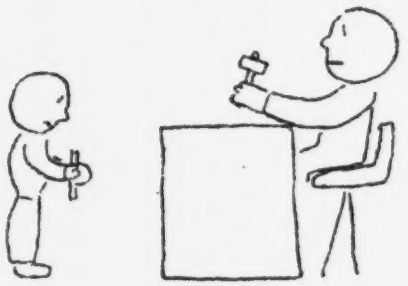
Take a walk around your neighborhood.



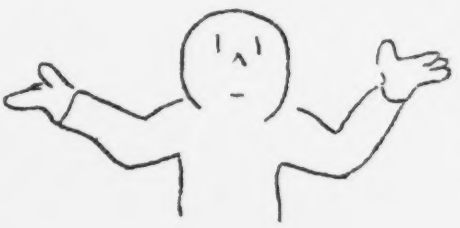
Count the burning barrels and incinerators.



Is there a law against burning trash and leaves in your city?

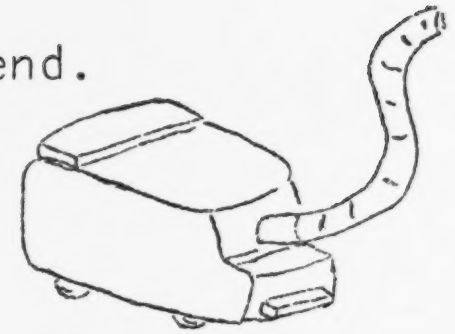


Why do you think the law was passed?



What else can be done with trash and leaves?

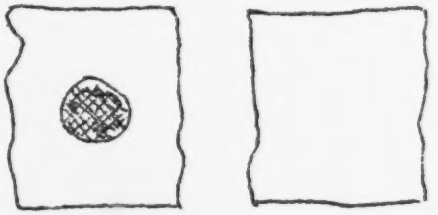
Borrow a vacuum cleaner
from your mother or a friend.



Put a clean tissue over
the end of the hose.
Hold it on with a rubber
band.

Turn on the cleaner for
a set time.

Compare the tissue with
an unused one.



Try this experiment at different times.
Try it in different places.
Be sure to label each one.
Compare them.
Where is air pollution the worst?
At what time is it worst?

# TEACHER'S GUIDE

## ACTION 4

How Does Air Get Polluted?

Blowing dust, ragweed pollen, odors from natural and industrial processes; all of these contribute to air pollution, but the greatest contributor by far is combustion, or burning.

For the candle demonstration, a large candle is preferable to the birthday type, although these could be used. The black material left on the white plate is unburned carbon from the burning candle. This represents the particulate matter that goes into the air when something is burned. Other pollutants from burning include; carbon monoxide, sulphur oxides, nitrogen oxides, and hydrocarbons. Use normal caution in working with fire.

The 90 million motor vehicles in the United States are our largest source of air pollution. These vehicles burn gasoline or diesel fuel. Many of these vehicles are inefficient and the exhaust is dark. The activity of counting vehicles may be varied in several ways. All of the vehicles that pass may be tallied along with a count of those emitting visible fumes, or separate groups could tally buses, trucks, and cars. A cold day will produce lots of visible plumes of "smoke" from car exhausts, however, most of this is water vapor condensing in the cold air, not usually thought of as air pollution. A point that should be made in discussing car exhausts is that only part of the pollution produced is visible.

Factories and power plants are highly visible sources of air pollution. Most of them burn coal or fuel oil containing sulphur; coal also produces fly ash when burned. Electrostatic precipitators and other devices can remove much of this smoke stack pollution, but these devices are quite expensive.

If microscope slides are not available, several other items may be substituted. White file cards, plain pieces of glass, or simply wash several panes of a window.

Burning leaves and trash is now illegal in Illinois within one mile of any municipality with a population of 1,000 or more. The point that needs to be stressed with children is that there are better ways of taking care of trash and leaves. Leaves should be composted or mulched (see OSTEE handout on this) thereby putting the nutrients back into the soil. Quite a bit of our household trash can be recycled. (OSTEE has a handout on this, also.) Glass, paper, and tin cans are examples of recyclable trash. Trash that isn't practical to recycle at this time can be buried in a good sanitary landfill or incinerated in a modern incinerator.

## ENVIRONMENT Idea 2 Air

## Action 5

### What Can I Do?

The Clean-Air, Healthy, Anti-Pollution, Air Saving, Go-To-It, Good Guys Club.

Form a club - elect a president
make a pledge
write a constitution
and so on...

Make posters, badges...

Write letters - to congressmen, senators, governors, mayors...
Be tactful (kind)
Thank people that are doing something good about pollution.

Have an Open House - invite your parents, friends, the mayor, the school superintendent...

Decorate the room - write a play and perform it - take slides or movies and show them - go on a field trip.

The "Anti-Pollution Critters" could be a club with their own symbol, for example:

Up, up with clean air
We'd like to breathe it
wherever we go.
Up, up with clean air
It's the best kind of air
you know!
(tune of "Up, Up With People")

Cheer for Anti-Pollution Critters:

"The Anti-Pollution Critters are here
to say
Keep our air clean in every way.
Do not pollute the air and you will
see
What a clear sky there can be!"

Chant this poem like a cheer.

Pictures can be drawn of the Anti-Pollution Critter looking at a city filled with polluted air and then a happy critter looking at a non-polluted area.

**Suggested by: Sister Ann Rafael, Holy Ghost School, Jerseyville.**

# LONELY LITTLE PETUNIA IN THE ONION PATCH GAME

## RULES OF THE GAME

2, 3, or 4 players

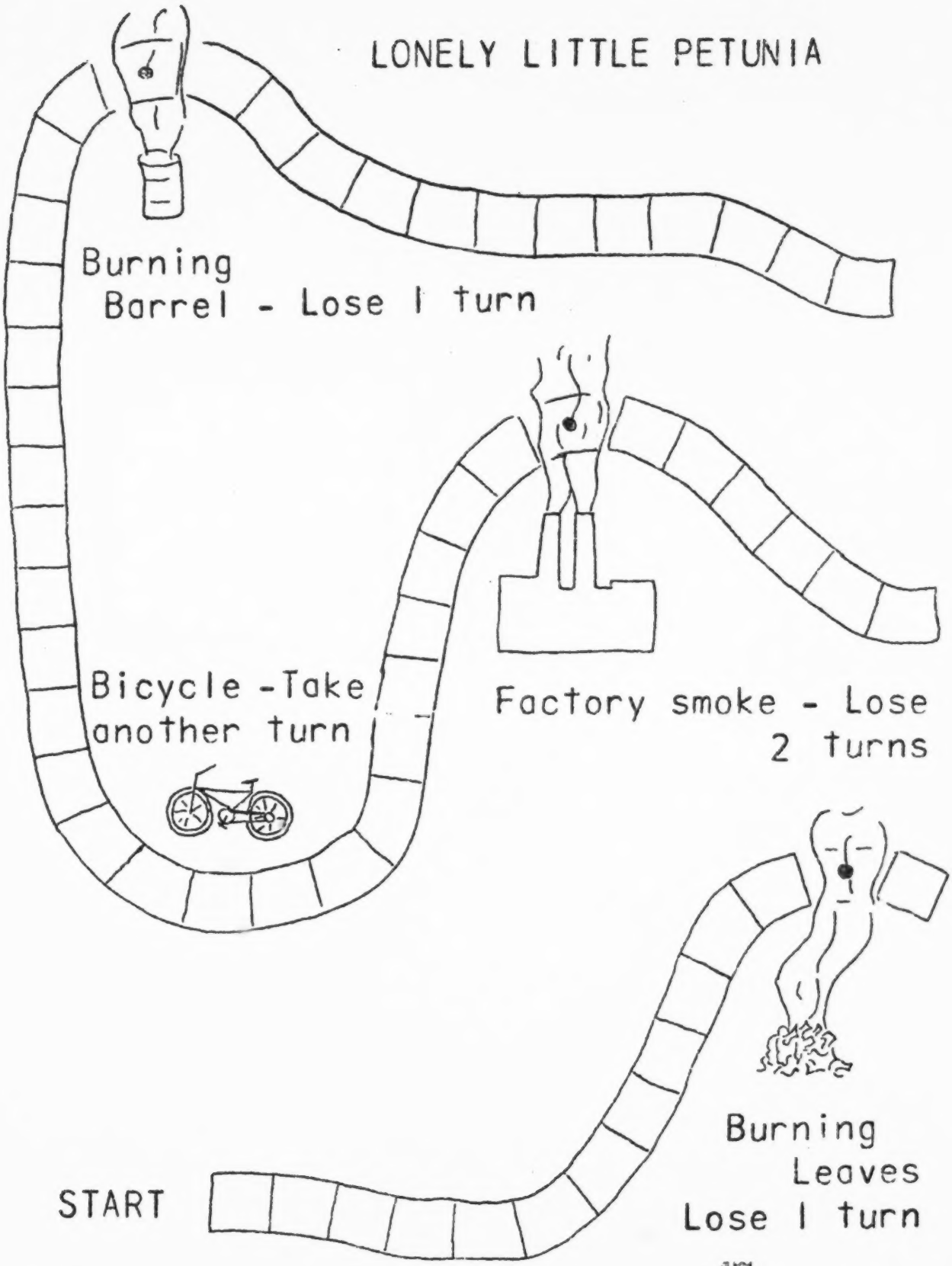
Object: To move "Petunia" out of the onion patch.

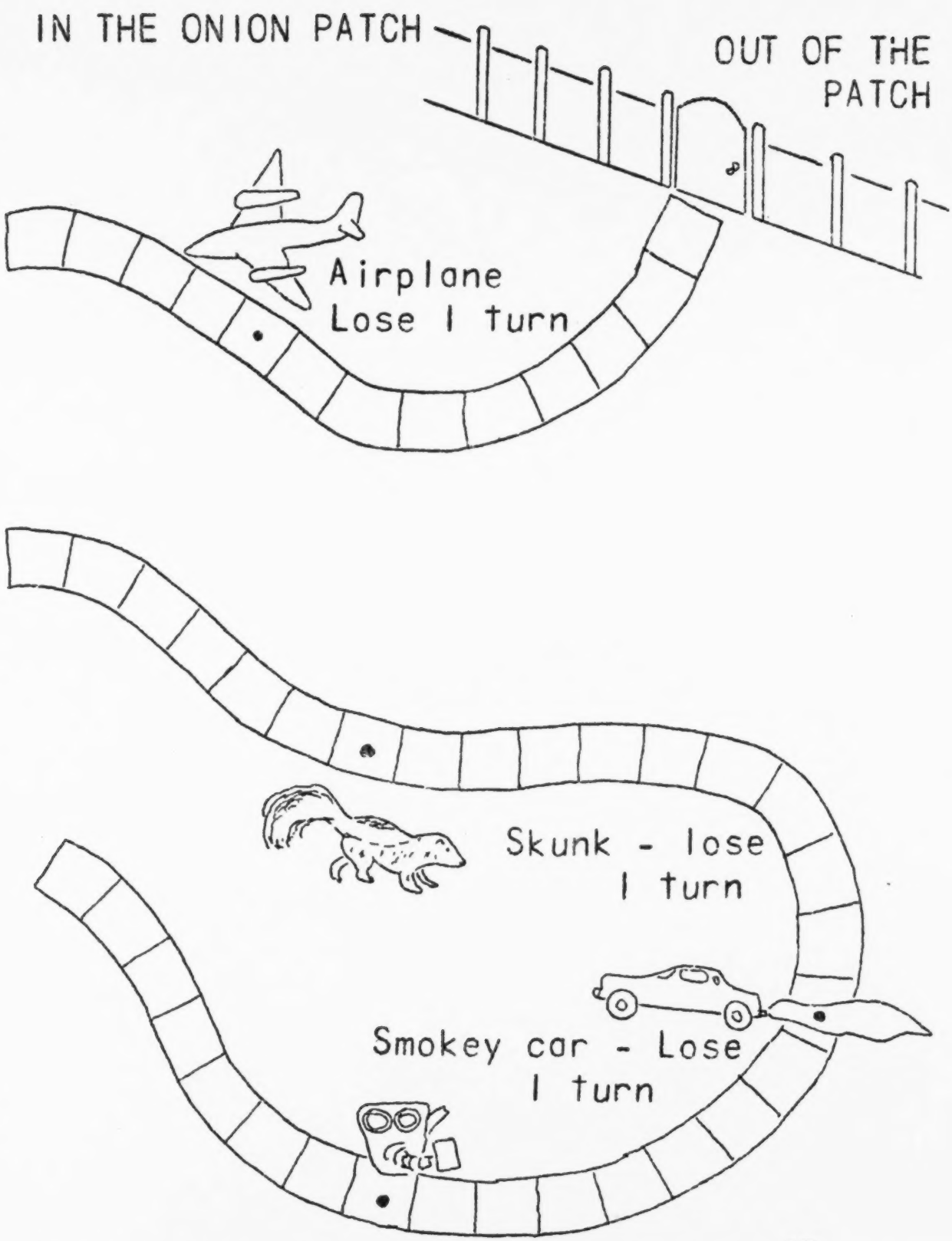
Each player should have a different colored marker (Petunia).

Players spin in turns. Each moves his marker as many spaces as the spinner says.

If the move lands a player on a marked space, they must follow the directions on the board.

The game is won when one of the players gets "Out of the Patch". If more than 2 are playing, the others may continue playing until all but one is out.


LONELY LITTLE PETUNIA
Burning Barrel - Lose 1 turn
Factory smoke - Lose 2 turns
Bicycle - Take another turn
Burning Leaves Lose 1 turn
START


IN THE ONION PATCH
OUT OF THE PATCH
Airplane
Lose 1 turn
Skunk - lose
1 turn
Smokey car - Lose
1 turn
Gas mask - Take another turn

0


4
1
2
5
3
4
2
1
2
3
2
5
1
2

# TEACHER'S GUIDE

# ACTION 5

What Can I Do?

The Clean-Air, Healthy, Anti-Pollution, Air Saving, Go-To-It, Good Guys Club.

Neither the title nor the ideas presented are intended to be followed verbatim. Your students can pick their own name. The most important aspect is that this be the students' club. The teacher's role should be that of consultant and the only exception to this rule would be to stop students from doing more harm than good (i.e., don't let them "shotgun" letters of abuse to business and industries in the area.)

Lonely Little Petunia In The Onion Patch Game

Remember the popular song of several years ago, "I'm a Lonely Little Petunia in an Onion Patch, and All I Do Is Cry All Day"? This game recreates the discomfort felt by that little flower and provides a way out of the onion patch. (Hopefully, the children will see the analogy to air pollution!)

The game is similar to Uncle Wiggley with the substitution of a spinner for cards. The board and spinner should be cut and trimmed as necessary and mounted on cardboard. The spinner arrow is attached by a brass staple.

# ENVIRONMENT Idea 2 Air

## Action 6

## "Let's Go on a Field Trip!"

A field trip is to be taken during your teaching of the air unit. The field trip is an integral part of the air unit. It emphasizes the concepts learned, or to be learned by the students. On-the-spot observation is a valuable learning technique. Consult the "Teachers' Policy Handbook" for field trip dress, discipline, and general instructions.

## A. Concepts Are Important.

Mind filling, factual, see-all field trips have been a traditional approach to the field trip in the past. The question is, "Is the child given any responsibility for learning on his own?" Does he retain more from being spoon-fed facts or from being allowed to learn from his own interest and involvement?

Experience and research indicate that children learn more when they become personally involved in the learning process. This can be achieved by allowing the child to participate in the initial planning of the field trip, and to select a specific investigation on the field trip for which he will be responsible. These specific investigations will be within the bounds of the concepts to be presented on the field trip and in the unit.

The concepts below are only a few of the many that students should come to understand when learning about the environment. Additional concepts may be emphasized at the teachers' discretion. The concepts to be presented are as follows:

1. Air is a natural resource.
2. Man is dependent on the renewable resources for his survival.
3. Everyone has the responsibility for conserving the air around him.
4. Living things are interdependent with each other and with their environment.
5. Change is the only constant of our environment.

## B. Where Are the Sites?

The above concepts can be illustrated at a number of field sites. The actual field trip site choice should result in a discussion with your students. Let the students feel a part of the final decision. Their interest will be enhanced by your concern over their choices.

Suggested field sites would include:

1. air pollution monitoring boards
2. busy intersection
3. school parking lot.

## C. Let's Experiment!

Suggested Field Trip Activities

Methods of procedure in carrying out these activities should be carefully planned and reviewed in preparation for the field experience. Considerations to be made are:

a. equipment or supplies needed to carry out the activity
b. method of recording the data to be gathered
c. method of recording the data in a meaningful way
d. follow-up activities that will extend and strengthen the concept

Activity 1 - The Lone Ranger Approach (in the field)

Before going on the field trip, ask a student to wear a face mask containing a filter pad during the length of the trip. While on the trip, observe the filter several times for particulate matter. After the trip, remove the filter and observe through a hand lens the possible particulate matter. Compare the results with an unused filter. What happens to the particulate matter if you do not breathe through the filter?

Activity 2 - Car Exhausts

Use vaseline coated cardboard squares to collect emissions from different auto exhausts. Hold the squares at a safe distance from the exhausts while the owner (or authorized person) starts the automobile. Label the cardboard squares with the make, model, and year of the automobile. In the classroom, compare and discuss the results of this activity.

# ENVIRONMENT Idea 2 Air

## Action 7

## "Use Resources to Reach Greater Heights"

Often teachers desire additional reading material, visual experiences or discussions to enrich a student's learning experiences. Listed below are materials which may be borrowed from the Environmental Project Center, area resource people, and area film dealers. This listing, however, does not include resources which may be found in local school or public libraries.

### A. Resources Made Easy

The Project Staff has accumulated and filed a number of pamphlets, newspaper clippings and magazine articles which are available to teachers for use as resource material. Teachers may borrow, for two weeks, a maximum of four articles from any one heading in the vertical file. Articles may be obtained by mail, by contacting one of the Project Staff or by calling the Project Center at 786-3313. The following headings appear in the vertical file.

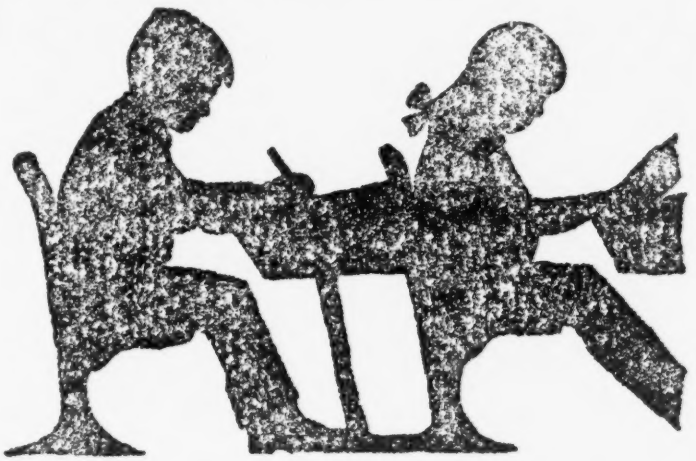
1. Air Pollution
2. Air Pollution - Control - Equipment
3. Air Pollution - Control - Individual
4. Air Pollution - Control - Industry
5. Air Pollution - Health
6. Air Pollution - Internal Combustion Engine
7. Air Pollution - Monitoring
8. Air Pollution - Primers
9. Algae - Airborne
10. Conservation - Water & Air

11. Conservation - Windbreaks
12. Energy
13. Gov't Control - Federal - Air
14. Gov't Control - Federal Illinois
15. Lead
16. Mercury
17. Natural Resources
18. Noise
19. Oxygen
20. Pollution - Industrial
21. Solid Waste
22. Transportation

## B. Multiple Student Materials

The Project Center also has multiple copies of certain resource materials which may be borrowed by a class. If the teacher desires, and it is possible, each student may study his personal copy of a pamphlet for a maximum of two weeks. Such bulk requests should be directed to the Project Staff.

The material listed below was obtained free of charge. The teacher or school librarian may obtain permanent copies for their building or classroom by directing requests to the following agencies.



1. "Air Pollution Explained: The Pollutants"

   National Tuberculosis & Respiratory Disease Association

   (brochure on the pollutants, their possible source, and some solutions.)

2. "Air Pollution: The Facts"

   Lewis - Clark TB & Res. Ass'n
   P.O. Box 158
   Wood River, Illinois 62095

   (brochure with general information)

3. "Clearing the Air"

Committee on Public Affairs
American Petroleum Institute
1271 Avenue of the Americas
New York, N.Y. 10020

(gives types of air pollutants, some history and control efforts)

4. "Everyday Facts About Air Pollution"

Manufacturing Chemists Ass'n
1825 Connecticut Ave., N.W.
Washington, D.C. 20009

(history of air pollution and community efforts to solve the problems)

5. "It's Your Problem - Air Pollution"

(Published by:)

Lewis - Clark TB & Res. Ass'n
P.O. Box 158
Wood River, Illinois 62095

(a fold-out cartoon brochure)

6. "What's Your Air Pollution IQ?"

Lewis - Clark TB & Res. Ass'n
Wood River, Illinois 62095

(short quiz)

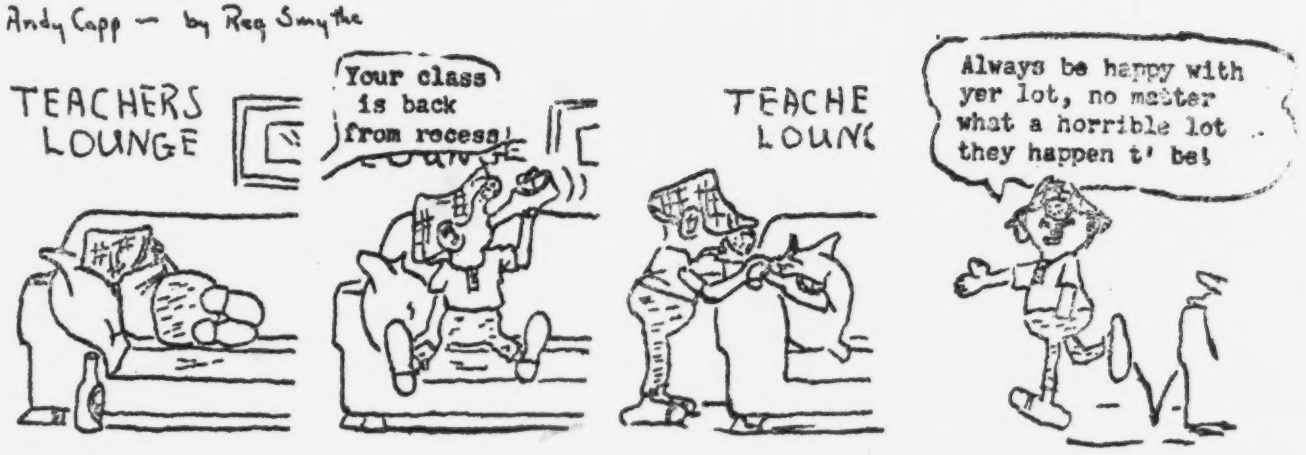
7. "When Air Pollution is Heavy"

Lewis - Clark TB & Res. Ass'n
P.O. Box 158
Wood River, Illinois 62095

(very small paper giving advice to people with respiratory diseases)

8. "You Can Help Keep Air and Water Clean"

Humble Oil and Refining Co.
Public Relations Dept., Room 492
P. O. Box 2180
Houston, Texas 77001


Andy Capp — by Reg Smythe
TEACHERS LOUNGE
Your class is back from recess!
TEACHE LOUNG
Always be happy with yer lot, no matter what a horrible lot they happen t' be!

## C. Experts in the Air

The following is a listing of possible resource people and their titles. You may want to contact one of these resource people concerning questions you have or the possibility of their speaking to your class. You may also want to contact your local high school concerning students qualified to speak to your class.

### Jersey County

Dwight Brass, Illinois Environmental Protection Agency:
Division on Air Pollution
Champaign, Illinois Phone: 217-333-8361

### Macoupin County

Dwight Brass, Illinois Environmental Protection Agency:
Division on Air Pollution
Champaign, Illinois Phone: 217-333-8361

# Madison County

Paul Hawkins, Madison County
Sanitation Officer
Madison County Court House
Edwardsville, Illinois 62025
Phone: 618-656-0913

Joe Nash, Engineer
Laclede Steel Corporation
Alton, Illinois 62002
Phone: 618-462-9731

Gary Rust, Sanitary Engineer
Illinois Environmental Protection
Agency; Division on Air Pollution
1800 St. Louis Rd.
Collinsville, Illinois 62234
Phone: 345-0368

George Sample, Engineer
Shell Oil Corporation
Wood River, Illinois 62095
Phone: 618-254-7371

Ed Sullivan, Engineer
American Oil Corporation
400 S. Main
Wood River, Illinois 62095
Phone: 618-254-7351

Dr. J. Edmund White
Chairman of Alton Ecological
Control Committee
Chemistry, Southern Illinois
University
Edwardsville, Illinois 62025
Phone: 618-692-2042

## D. "I See and I Remember..."

The following is a listing of free films which may be obtained if a teacher so desires. The films may be borrowed from the sources given below with the only cost involved being that of return postage. All films are in color except those designated by (*) asterick.

| TITLE OF FILM | SOURCE OF FILM | LENGTH |
|---|---|---|
| "Tom Leher Sings Pollution"<br><br>(excellent introduction to water and air pollution) | The Department of Conservation<br>Film Loan Service<br>113 State Office Bldg.<br>Springfield, IL 62706<br>Phone: 217-525-7453 | 3½ min. |